T. O. WERNER.

CHANGE SPEED GEARING.

APPLICATION FILED AUG. 6, 1917.

1,247,190.

Patented Nov. 20, 1917.

4 SHEETS—SHEET 1.

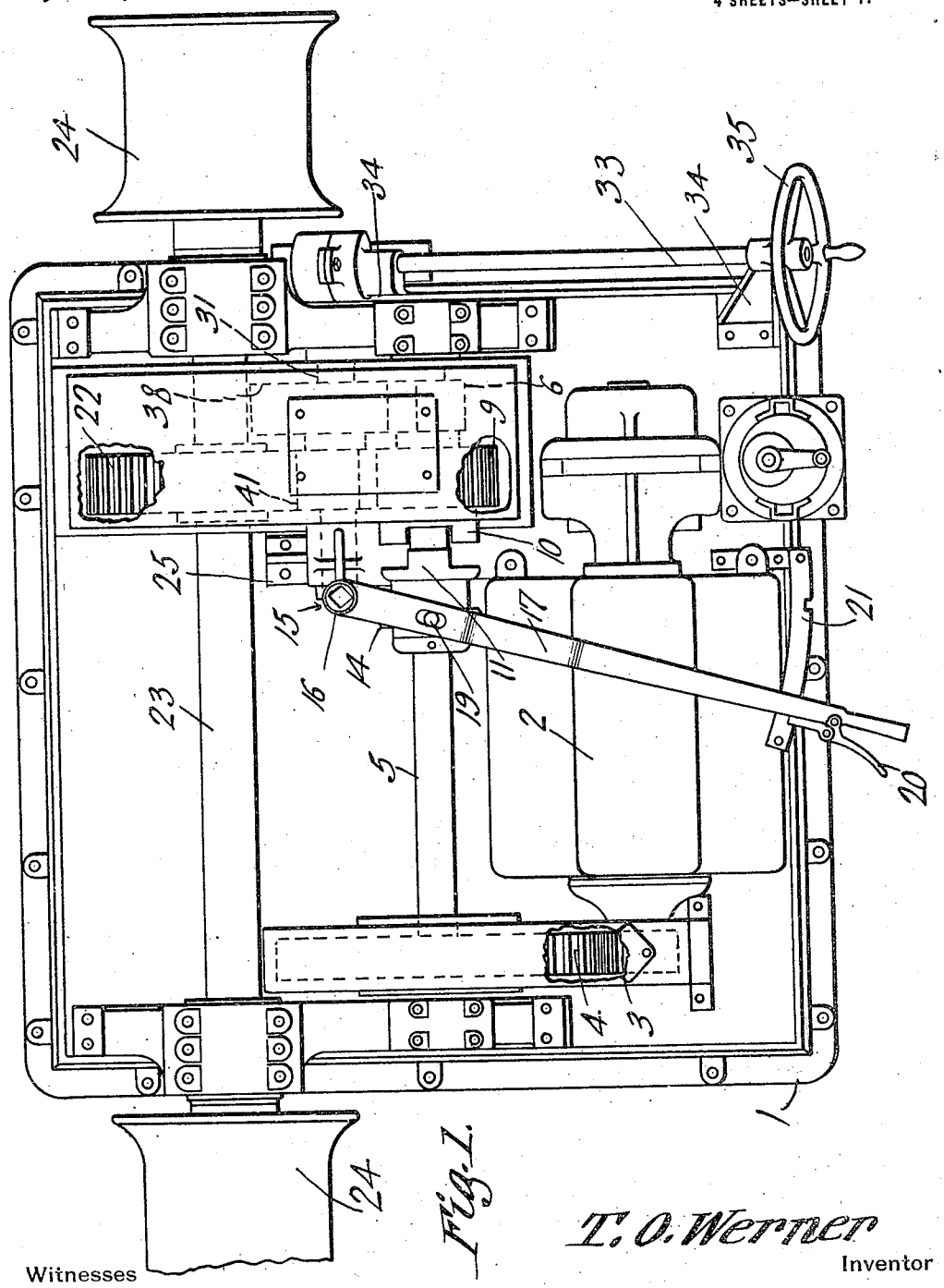


Fig. 1.

Witnesses

H. C. Mitchell

T. O. Werner

Inventor

by Crosby & Gregory.

Attorneys

T. O. WERNER.

CHANGE SPEED GEARING.

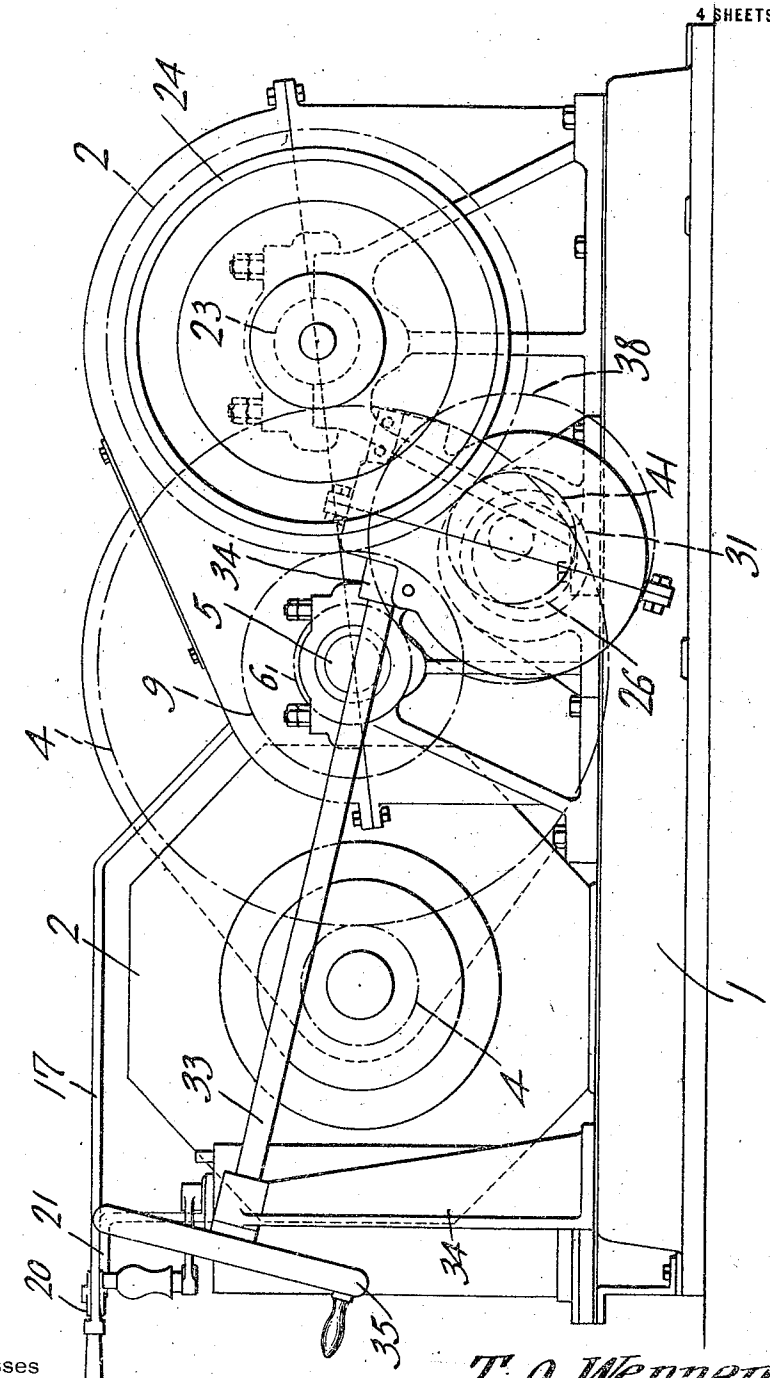
APPLICATION FILED AUG. 6, 1917.

1,247,190.

Patented Nov. 20, 1917.

4 SHEETS—SHEET 2.

Fig. 2.



Witnesses

H. A. Mitchell

T. O. Werner Inventor

by Cathorn & Co.

Attorneys

T. O. WERNER.

CHANGE SPEED GEARING.

APPLICATION FILED AUG. 6, 1917.

1,247,190.

Patented Nov. 20, 1917.

4 SHEETS—SHEET 3.

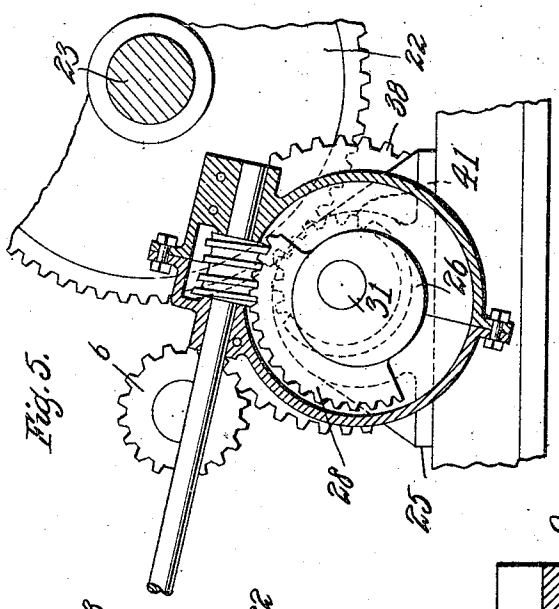


Fig. 5.

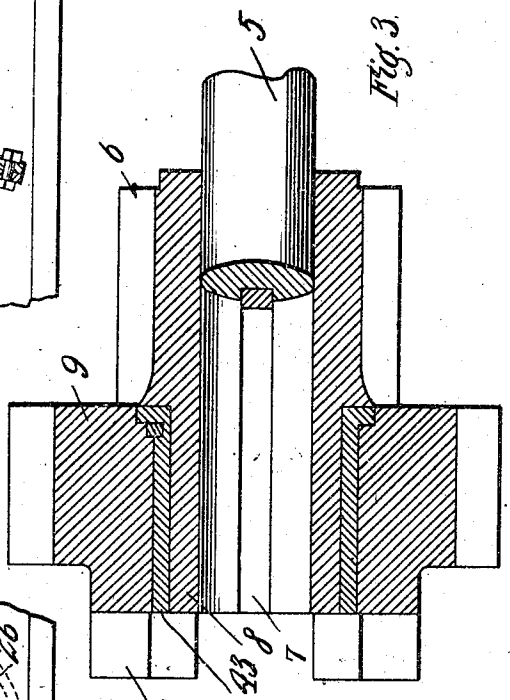


Fig. 3.

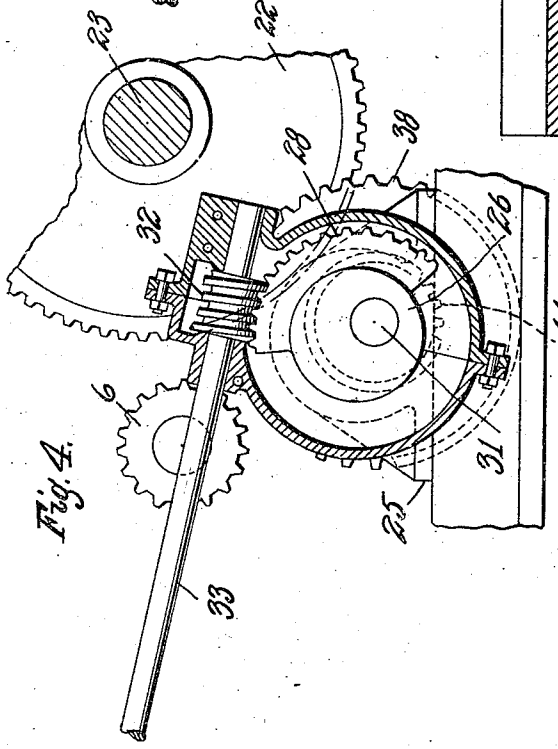


Fig. 4.

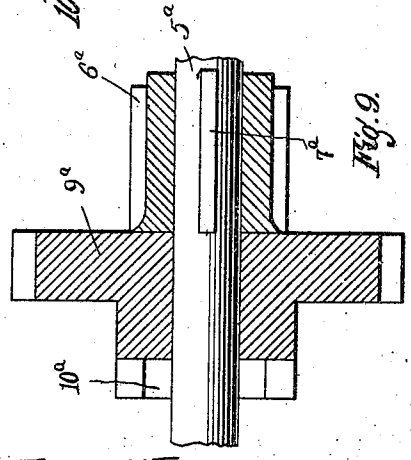


Fig. 6.

Witnesses

J. C. Fenelon

H. A. Mitchell

T. O. Werner
Inventor

by Cushman & Co.
Attorneys

T. O. WERNER.

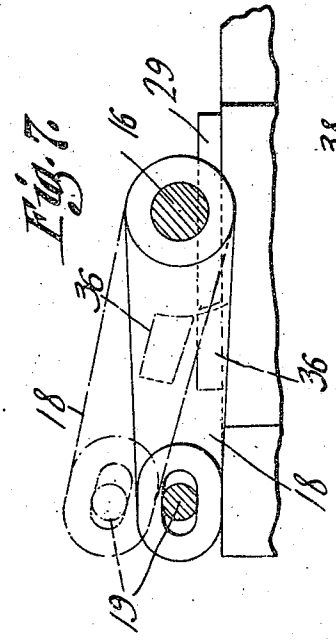
CHANGE SPEED GEARING.

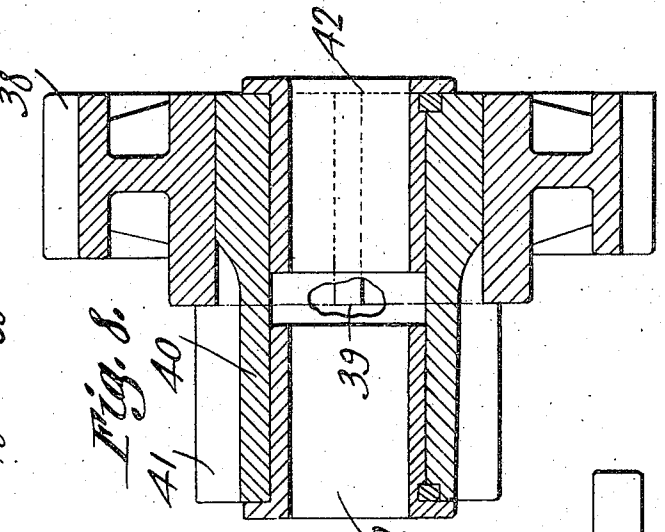
APPLICATION FILED AUG. 6, 1917.

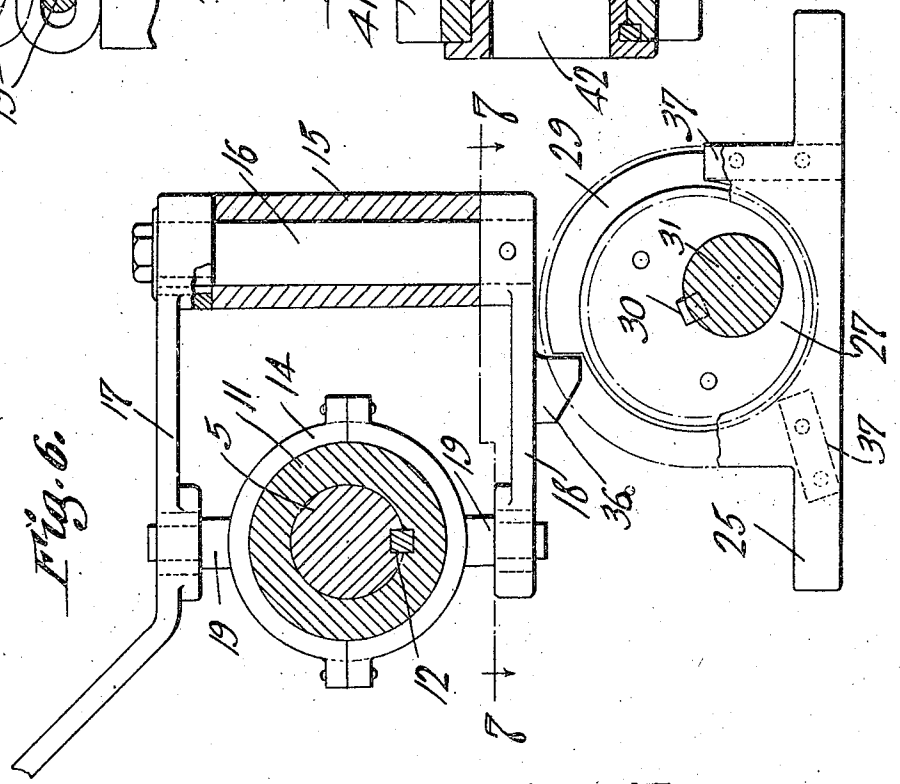
1,247,190.

Patented Nov. 20, 1917.

4 SHEETS—SHEET 4.







T. O. Werner

Inventor

Witnesses

J. C. Lonein

H. A. Mitchell

by C. A. Snow & Co.

Attorneys

UNITED STATES PATENT OFFICE.

THOMAS ODENWELDER WERNER, OF BANGOR, PENNSYLVANIA.

CHANGE-SPEED GEARING.

1,247,190. Specification of Letters Patent. Patented Nov. 20, 1917.

Application filed August 6, 1917. Serial No. 184,715.

To all whom it may concern:

Be it known that I, THOMAS O. WERNER, a citizen of the United States, residing at Bangor, in the county of Northampton and State of Pennsylvania, have invented a new and useful Change-Speed Gearing, of which the following is a specification.

The device forming the subject matter of this application is a winch, and one object of the invention is to provide novel means whereby the driving mechanism may be coupled up with the winding shaft to rotate the latter at different speeds, the invention aiming particularly to improve the means whereby the pinion and the gear wheel of the low speed drive are moved into and out of working position.

Another object of the invention is to provide novel means whereby it will be impossible to operate the high speed drive and the low speed drive at the same time.

It is within the province of the disclosure to improve generally and to enhance the utility of devices of that character to which the present invention appertains.

With the above and other objects in view, which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed can be made within the scope of what is claimed, without departing from the spirit of the invention.

In the accompanying drawings:

Figure 1 shows in the top plan, a winch constructed in accordance with the present invention, parts being broken away;

Fig. 2 is an end elevation of a winch embodying the present improvements;

Fig. 3 is a sectional detail showing certain of the pinions in the winch;

Fig. 4 is an elevation showing parts of the structure as the same will appear when the high speed drive is in operation, parts of the framework being removed;

Fig. 5 is a view similar to Fig. 4, but showing parts in positions which they will occupy when the low speed drive is in operation;

Fig. 6 is a sectional detail showing the mechanism whereby a simultaneous operation of the low speed drive and the high speed drive is prevented;

Fig. 7 is a section taken approximately on the line 7—7 of Fig. 6; and

Fig. 8 is a sectional detail showing a part of the gearing.

Fig. 9 is a sectional detail illustrating a slight modification.

In the drawings, the numeral 1 has been employed to denote generally a frame which carries the working parts of the winch hereinafter described. The frame 1 may be of any desired form. The driving instrumentalities will be selected to suit the work in hand, but in the present instance, the frame 1 is shown as supporting a motor 2, the shaft of which carries a pinion 3 meshing into a gear wheel 4 fixed to a shaft 5 journaled in the frame 1.

Noting Fig. 3 in comparison with Fig. 1, the drawings disclose a pinion 6 which is keyed at 7 to the shaft 5. The pinion 6 includes a hub 8 on which a pinion 9 is mounted to rotate, the pinion 9 inclosing a bushing 43 which in its turn surrounds the hub 8 of the pinion 6. The pinion 9 carries a clutch element 10.

A clutch element 11 is adapted to coöperate with the clutch element 10 and is splined, as shown at 12 in Fig. 6, to the shaft 5, to slide therealong, the clutch element 11 being operated by means of a shift ring 14. The framework of the machine includes a bearing 15, in which a shaft 16 is mounted to rock (Fig. 6). Secured to the upper end of the shaft 16 is an operating lever 17 having a latch mechanism 20 adapted to coöperate with a segment 21 carried by the frame 1. That end of the lever 17 which is connected to the shaft 16 may be denominated an arm, and secured to the lower end of the shaft 16 is an arm 18. The operating lever 17 and the arm 18 coact with studs 19, carried by the shift ring 14.

The numeral 22 marks a gear wheel which meshes with the pinion 9, the gear wheel being secured to a winding shaft 23 journaled in the frame 1 and terminally provided with drums 24.

The mechanism above described constitutes a high speed drive for the winding shaft 23. The motor 2 actuates the pinion 3, the latter driving the gear wheel 4 and imparting rotation to the shaft 5. The clutch 11 may be manipulated by means of the lever 17 to engage with the clutch 10 which constitutes a part of the pinion 9,

rotation being imparted to the pinion 9 in this way. The pinion 9 meshing with the gear wheel 22, and rotates the winding shaft 23 and consequently the drums 24.

The low speed drive and its operations will now be considered.

Erected on the frame 1 are bearings 25 in which eccentrics 26 and 27 are journaled for rocking movement. The eccentric 26 is connected with an arcuate rack 28 actuated by an operator, through the medium of a worm 32 fixed to an inclined shaft 33 journaled in supports 34 carried by the frame 1, the shaft 33 being supplied with a hand wheel 35 or other suitable means whereby the said shaft can be rotated. The eccentric 27 is provided with an arcuate shoulder 29. The ends of the shoulder 29 coöperate with a projection 36 on the arm 18 which is actuated by the shaft 16 and the operating lever 17, and the side face of the shoulder 29 acts with the projection 36, in a manner which will be pointed out hereinafter. At times, the shoulder 29 engages at its ends with stops 37 which, as shown in Fig. 6, may be carried by one of the bearings 25.

A shaft 31 is keyed at 30 to the eccentrics 26—27, the construction being such that when the eccentrics are rotated, the shaft 31 will be raised and lowered, in an orbit. Fig. 8 discloses in detail a gear wheel 38 which is adapted to move into and out of mesh with the pinion 6, the latter being driven by the shaft 5. The gear wheel 38 is keyed at 39 to a sleeve 40 constituting a part of a pinion 41, the pinion 41 being adapted to move into and out of mesh with the gear wheel 22 on the winding shaft 23. The sleeve 40 may carry bushings 42 in which the shaft 31 of the eccentrics 26 and 27 is mounted, the construction being such that the pinion 41 and the gear wheel 38 may rotate together on the shaft 31.

Let it be supposed that it is desired to rotate the winding shaft 23 at low speed. Then the clutch element 11 is disengaged from the clutch element 10 of the pinion 9, by means of the operating lever 17 and there is no direct driving connection between the shaft 5 and the winding shaft 23, since the pinion 9 which meshes with the gear wheel 22 on the winding shaft 23 is free to rotate with respect to the hub 8 of the pinion 6. The shaft 33 is rotated by means of the hand wheel 35 and the worm 32, meshing into the rack 28, serves to rotate the eccentrics 26 and 27 in the bearings 25 and effect an elevation of the shaft 31 from the position of Fig. 4 to the position of Fig. 5, the gear wheel 38 being brought into mesh with the pinion 6, and the pinion 41 being brought into mesh with the gear wheel 22 on the winding shaft 23. Thus there is established a low speed driving train embodying the motor 2, or its equivalent, the pinion 3, the gear wheel 4, the shaft 5, the pinion 6, the gear wheel 38 and the pinion 41, which rotate together on the shaft 31 of the eccentrics 26 and 27, the gear wheel 22 into which the pinion 41 meshes, and the winding shaft 23 which carries the drums 24.

A person skilled in the art will understand that the high speed and the low speed drives should not be operated at the same time. It is to avoid a contingency of this kind that the structure shown in Figs. 6 and 7 is provided.

When the lever 17 is manipulated then the projection 36 on the arm 18 lies in the path of one end of the shoulder 29 on the eccentric 27, as shown in Fig. 6. It will, therefore, be impossible to rotate the eccentrics 26 and 27 by means of the shaft 23 and the hand wheel 35.

When the eccentrics 26 and 27 are rotated by means of the shaft 33, as above described, the shoulder 29 is moved around until its side face lies in the path of the projection 36 on the arm 18. Consequently, attempt is made to manipulate the high speed drive by means of the lever 17, then the projection 36 will engage with the side face of the shoulder 29, and a shifting of clutch 11 with respect to the clutch 10 will be impossible.

When the eccentrics 26 and 27 are rotated by means of the shaft 33, the ends of the shoulder 29 engage the stops 37 to limit the rotation of the eccentrics, and consequently to limit the amount which the shaft 31, the gear wheel 38 and the pinion 41 are raised and lowered.

In Fig. 9, the pinion 6^a is keyed at 7^a to the shaft 5^a and the pinion 9^a carrying the clutch 10^a rotates directly on the shaft 5^a.

Having thus described the invention, what is claimed is:

1. Gearing for a winch comprising a driving shaft; a winding shaft; a driving train between the driving shaft and the winding shaft and including a first gear wheel on the winding shaft; a clutch forming a releasable connection between the driving shaft and the driving train; a first pinion secured to the driving shaft; an eccentric and a bearing therefor; means for rotating the eccentric in the bearing; a third shaft carried by the eccentric; a second gear wheel carried by the shaft and adapted to mesh with the first pinion; and a second pinion carried by the third shaft and rotatable with the second gear wheel, the second pinion being adapted to mesh with the first gear wheel.

2. Gearing for a winch constructed in accordance with claim 1, in combination with means for shifting the clutch; and interengageable elements on the clutch shifting means and on the third shaft which coact to prevent simultaneous operation of

the clutch shifting means and the means for rotating the eccentric.

3. Gearing for a winch constructed in accordance with claim 1, in combination with a shoulder on the third shaft; and a means for shifting the clutch, the clutch shifting means including an element engaging the end of the shoulder at one time to prevent an operation of the means for rotating the eccentric, and engaging the side face of the shoulder at another time to prevent an operation of the means for shifting the clutch.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

THOMAS ODENWELDER WERNER.

Witnesses:
WILLIAM H. LINDEMAN,
HILDA E. GRIFFITH.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."